These days, the environmental awareness is of utmost importance. Hence, making public transportation attractive for private and corporate customers is more in demand than ever. In the past century, many shortest path algorithms were developed for finding optimal routes in static networks. However, real-life problems like route planning within a public transportation system are not that simple. In reality, there are certain restrictions, such as fixed departure schedules or non-accessibility for handicapped people. This thesis is dealing with the problem of finding a route for a given start and destination at a certain point of time such that the arrival at the destination is as early as possible, respecting timetables, different choices of modes of transportation and switching points. Therefore, two different models of a public transportation network will be presented in the first part, one with time dependent edge weights and one using a static graph. Before solving the problem of finding an optimal (shortest) route via these networks, the problem will be translated into an integer linear program (ILP) especially to enable further amplifications and constraints. Subsequently, the focus will lie on the algorithms that manage to solve the problem. In this thesis, we concentrate on an adjusted Dijkstra algorithm, which was also implemented in the course of this thesis (using C++). However, an adapted Bellman-Ford algorithm will be presented as an alternative. In the scope of this thesis, an internet site was established, providing the possibility of using the results and
testing the implemented algorithm.